§ 154.1872 Cargo emergency jettisoning.

(a) The master shall ensure that emergency jettisoning piping under §154.356, except bow and stern loading and discharging piping, is only used when an emergency exists.

(b) Emergency jettisoning piping when being used may be outside of the transverse tank location under §154.310.

(c) The master shall ensure that cargo is not jettisoned in a U.S. port.

(d) When ethylene oxide is carried, the master shall ensure that the emergency jettisoning piping with associated pumps and fittings is on-line and ready for use for an emergency.

(e) The master shall lock closed the shut-off valves under §154.356 when the emergency jettisoning piping is not in use.

(f) The person in charge of cargo transfer shall ensure that after the emergency jettisoning piping is used it is purged of cargo vapors with inert gas.

(g) The person in charge of cargo transfer shall ensure that entrances, forced or natural ventilation intakes, exhausts, and other openings to accommodation, service, or control spaces facing the emergency jettisoning piping area and alongside the emergency jettisoning piping are closed when this piping is in use.

TABLE 4—SUMMARY OF MINIMUM REQUIREMENTS

Cargo name [1]	Ship type	Independent tank type C required	Control of cargo tank vapor space	Vapor detection [2]	Gauging [3]	Electrical hazard class and group [4]	Special requirements
Acetaldehyde	IIG/IIPG	....	Inert	I & T	C	I–C	154.1410 (c), 154.1410, 154.1710, 154.1720, 154.1870.
Ammonia, anhydrous.	IIG/IIPG	....	....	T	C	I–D	154.1000, 154.1400 (c), 154.1405, 154.1410, 154.1702 (b), (c), (e), 154.1760, 154.1870.
Butadiene	IIG/IIPG	....	Inert	I	R	I–B	154.1702 (b), (d), (f), 154.1710, 154.1750, 154.1818.
Butane	IIG/IIPG	....	....	I	R	I–D	None.
Butylene	IIG/IIPG	....	....	I	R	I–D	None.
Dimethylamine	IIG/IIPG	....	....	I & T	C	I–C	154.1400 (c), 154.1405, 154.1410, 154.1702 (b), (c), (e), 154.1870.
Ethane	IIG	....	....	I	R	I–D	None.
Ethylamine	IIG/IIPG	....	....	I & T	C	I–C	154.1400 (c), 154.1405, 154.1410, 154.1702 (b), (c), (e), 154.1870.
Ethyl Chloride	IIG/IIPG	....	....	I & T	R	I–D	154.1870.
Ethylene	IIG	....	....	I	R	I–C	None.
Ethylene oxide	IG	Yes	Inert	I & T	C	I–B	154.660 (b) (3), 154.1400 (c), 154.1405, 154.1410, 154.1702 (b), (d), (f), 154.1705, 154.1710, 154.1720, 154.1725, 154.1730, 154.1870 (a), (b).
Methane (LNG).	IIG	....	....	I	C	I–D	154.703 through 154.709, 154.1854.
Methyl acetylene-propadiene mixture.	IIG/IIPG	....	....	I	R	I	154.1735.
Methyl bromide.	IG	Yes	....	I & T	C	I–D	154.660 (b) (3), 154.1345 (c) (d), 154.1400 (c), 154.1405, 154.1410, 154.1702 (a), (d), 154.1705, 154.1720, 154.1870 (a), (b).
Methyl chloride.	IIG/IIPG	....	....	I & T	C	I–D	154.1702 (a), 154.1870.
Nitrogen	IIIG	....	....	O	C	....	154.1755.

TABLE 4—SUMMARY OF MINIMUM REQUIREMENTS—Continued

Cargo name [1]	Ship type	Independent tank type C required	Control of cargo tank vapor space	Vapor de-tection [2]	Gauging [3]	Electrical hazard class and group [4]	Special requirements
Propane	IIG/IIPG ..	....	....	I	R	I–D	None.
Propylene	IIG/IIPG ..	....	....	I	R	I–D	None.
Refrigerant	IIIG	....	....	....	R	....	None.
Sulfur dioxide	IG	Yes	Dry	T	C	....	154.660 (b) (3), 154.1345 (c), (d), 154.1400 (c), 154.1405, 154.1410, 154.1705, 154.1715, 154.1720, 154.1870 (a), (b).
Vinyl chloride	IIG/IIPG ..	....	....	I & T	C	I–D	154.1405, 154.1410, 154.1702 (a) (b) (d) (f), 154.1710, 154.1740, 154.1745, 154.1750, 154.1818, 154.1830 (f), 154.1870.

[1] Refrigerant gases include non-toxic, non-flammable gases such as: dichlorodifluoromethane, dichloromonofluoromethane, dichlorotetrafluoroethane, monochlorodifluoromethane, monochlorotetrafluoroethane, and monochlorotrifluoromethane.

[2] As used in this column: "I" stands for flammable vapor detection; "T" stands for toxic vapor detection; "O" stands for oxygen detection; and see §§ 154.1345 thru 154.1360.

[3] As used in this column: "C" stands for closed gauging; "R" stands for restricted gauging; and see § 154.1300.

[4] The designations used in this column are from the National Electrical Code.

[CGD 74–289, 44 FR 26009, May 3, 1979; 44 FR 59234, Oct. 15, 1979]

APPENDIX A TO PART 154—EQUIVALENT STRESS

I. Equivalent stress (σ c) is calculated by the following formula or another formula specially approved by the Commandant (G–MSO) as equivalent to the following:

$$\sigma_c = \sqrt{\sigma_x^2 + \sigma_y^2 - \sigma_x \sigma_y + 3\tau_{xy}^2}$$

where:

σ_x=total normal stress in "x" direction.
σ_y=total normal stress in "y" direction.
τ_{xy}=total shear stress in "xy" plane.

II. When the static and dynamic stresses are calculated separately, the total stresses in paragraph I are calculated from the following formulae or another formulae specially approved by the Commandant (G–MSO) as equivalent to the following:

$$\sigma_x = \sigma_x(\text{static}) \pm \sqrt{\sum (\sigma_x(\text{dynamic}))^2}$$

$$\sigma_y = \sigma_y(\text{static}) \pm \sqrt{\sum (\sigma_y(\text{dynamic}))^2}$$

$$\tau_{xy} = \tau_{xy}(\text{static}) \pm \sqrt{\sum (\tau_{xy}(\text{dynamic}))^2}$$

III. Each dynamic and static stress is determined from its acceleration component and its hull strain component from hull deflection and torsion.

[CGD 74–289, 44 FR 26009, May 3, 1979, as amended by CGD 82–063b, 48 FR 4782, Feb. 3, 1983]

APPENDIX B TO PART 154—STRESS ANALYSES DEFINITIONS

The following are the standard definitions of stresses for the analysis of an independent tank type B:

Normal stress means the component of stress normal to the plane of reference.

Membrane stress means the component of normal stress that is uniformly distributed and equal to the average value of the stress across the thickness of the section under consideration.

Bending stress means the variable stress across the thickness of the section under consideration, after the subtraction of the membrane stress.

Shear stress means the component of the stress acting in the plane of reference.

Primary stress means the stress produced by the imposed loading that is necessary to balance the external forces and moments. (The basic characteristic of a primary stress is that it is not self-limiting. Primary stresses that considerably exceed the yield strength result in failure or at least in gross deformations.)

Primary general membrane stress means the primary membrane stress that is so distributed in the structure that no redistribution of load occurs as a result of yielding.

Primary local membrane stress means the resulting stress from both a membrane stress, caused by pressure or other mechanical loading, and a primary or a discontinuity effect that produces excessive distortion in the transfer of loads to other portions of the structure. (The resulting stress is a primary local membrane stress although it has some characteristics of a secondary stress.) A stress region is local if:

$$S_1 \leq 0.5\sqrt{Rt}; \text{ and}$$

$$S_2 \leq 2.5\sqrt{Rt}$$

where:

S_1=distance in the meridional direction over which the equivalent stress exceeds 1.1 f.

S_2=distance in the meridional direction to another region where the limits for primary general membrane stress are exceeded.

R=mean radius of the vessel.

t=wall thickness of the vessel at the location where the primary general membrane stress limit is exceeded.

f=allowable primary general membrane stress.

Secondary stress means a normal stress or shear stress caused by constraints of adjacent parts or by self-constraint of a structure. The basic characteristic of a secondary stress is that it is self-limiting. Local yielding and minor distortions can satisfy the conditions that cause the stress to occur.

PART 155 [RESERVED]